

WHAT IS CLAIMED IS:

1. A composite fibrous substrate comprising core fibers and a protein sheath attached around the individual core fibers and wherein the protein sheath is adhered to itself by covalent bonds.

2. A composite fibrous substrate according to claim 1 wherein the protein sheath further comprises at least one auxiliary component.

3. A composite fibrous substrate according to claim 2 wherein the auxiliary component is selected from the group consisting of metal colloids, magnetic colloids, infrared-absorbing compounds, ultraviolet light-blocking compounds, bioactive agents, flame-retardant chemicals, anti-static agents, odor-absorbing compounds, neutralizers, and hydrolyzable linkers.

4. A composite fibrous substrate according to claim 2 wherein the auxiliary component is a colorant.

5. A composite fibrous substrate according to claim 1 wherein the core fibers are selected from the group consisting of synthetic fibers, man-made fibers, and natural fibers.

6. A method of preparing a composite fibrous substrate, the method comprising the steps of: contacting a fibrous substrate comprising core fibers with an aqueous solution of water-soluble protein and a crosslinker and, optionally, a suitable crosslinker catalyst; optionally, contacting the fibrous substrate with an acidic reducing agent that regenerates the original insoluble protein structure; heating the fibrous substrate to dryness; and curing at a temperature sufficient to cause reaction between the crosslinker and the protein; to give a composite fibrous substrate comprising a protein sheath attached around the individual fibers of the substrate and wherein the protein sheath is adhered to itself by covalent bonds.

7. A method according to claim 6 wherein the aqueous solution further comprises at least one auxiliary component.

8. A method according to claim 7 wherein the auxiliary component is selected from the group consisting of colorants, metal colloids, magnetic colloids, infrared-absorbing compounds, ultraviolet

light-blocking compounds, bioactive agents, flame-retardant chemicals, anti-static agents, odor-absorbing compounds, neutralizers, and hydrolyzable linkers.

9. A method according to claim 6 which further comprises the step of reacting the protein sheath with at least one auxiliary component to bind the auxiliary component onto or within the protein sheath.

10. A method according to claim 9 wherein the auxiliary component is selected from the group consisting of metal colloids, magnetic colloids, infrared-absorbing compounds, ultraviolet light-blocking compounds, bioactive agents, flame-retardant chemicals, anti-static agents, odor-absorbing compounds, neutralizers, and hydrolyzable linkers.

11. A method according to claim 9 wherein the auxiliary component is a colorant.

12. A method according to claim 6 which further comprises the step of treating the composite fibrous substrate with a post-processing treatment generally used on wool.

13. A method of dyeing a composite fibrous substrate, the method comprising preparing a composite fibrous substrate according to claim 6; and reacting the protein sheath with at least one colorant to bind the colorant onto or within the protein sheath; to give a dyed composite fibrous substrate having the colorant on or in the protein sheath.

14. A method according to claim 13 wherein the colorant is lighter than the color of the core fibers of the fibrous substrate.

15. A method according to claim 13 wherein the colorant is darker than the color of the core fibers of the fibrous substrate.

16. A method of dyeing a composite fibrous substrate, the method comprising:
 contacting a fibrous substrate comprising core fibers with an aqueous solution of water-soluble protein, a crosslinker, a colorant and, optionally, a suitable crosslinker catalyst;
 optionally, contacting the fibrous substrate with an acidic reducing agent that regenerates the original insoluble protein structure;

heating the fibrous substrate to dryness; and

curing at a temperature sufficient to cause reaction between the crosslinker and the protein;
to give a dyed composite fibrous substrate comprising a protein sheath attached around the
individual core fibers of the substrate and wherein the protein sheath is adhered to itself by covalent
5 bonds and wherein the colorant is within the protein sheath.

17. A method according to claim 16 wherein the colorant is lighter than the color of the core
fibers of the fibrous substrate.

10 18. A method according to claim 16 wherein the colorant is darker than the color of the core
fibers of the fibrous substrate.